

**PATENT COOPERATION TREATY**  
**PCT**  
**INTERNATIONAL PRELIMINARY EXAMINATION REPORT**  
(PCT Article 36 and Rule 70)

REC'D 02 APR 2004

WIPO PCT

Applicant's or agent's file reference ST/1008895pat	<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/APEA/416)	
International application No. PCT/SG 01/00261	International filing date (day/month/year) 31.12.2001	Priority date (day/month/year) 31.12.2001
International Patent Classification (IPC) or both national classification and IPC H04N7/50, H04N7/50		
Applicant STMICROELECTRONICS ASIA PACIFIC PTE LTD et al.		
<p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 7 sheets, including this cover sheet.</p> <p><input checked="" type="checkbox"/> This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of 4 sheets.</p> <p>3. This report contains indications relating to the following items:</p> <ul style="list-style-type: none"> <li>I <input checked="" type="checkbox"/> Basis of the opinion</li> <li>II <input type="checkbox"/> Priority</li> <li>III <input checked="" type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</li> <li>IV <input checked="" type="checkbox"/> Lack of unity of invention</li> <li>V <input checked="" type="checkbox"/> Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</li> <li>VI <input type="checkbox"/> Certain documents cited</li> <li>VII <input type="checkbox"/> Certain defects in the international application</li> <li>VIII <input type="checkbox"/> Certain observations on the international application</li> </ul>		

Date of submission of the demand 24.07.2003	Date of completion of this report 01.04.2004
Name and mailing address of the International preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer Güttlich, J Telephone No. +49 89 2399-2688



INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT

International application No.

PCT/SG 01/00261

**I. Basis of the report**

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

**Description, Pages**

1-27 as originally filed

**Claims, Numbers**

1-24 as amended (together with any statement) under Art. 19 PCT

**Drawings, Sheets**

1/8-8/8 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).  
 the language of publication of the international application (under Rule 48.3(b)).  
 the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

contained in the international application in written form.  
 filed together with the international application in computer readable form.  
 furnished subsequently to this Authority in written form.  
 furnished subsequently to this Authority in computer readable form.  
 The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.  
 The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

the description, pages:  
 the claims, Nos.:  
 the drawings, sheets:

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5.  This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).  
*(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)*

6. Additional observations, if necessary:

**III. Non-establishment of opinion with regard to novelty, inventive step and industrial applicability**

1. The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non-obvious), or to be industrially applicable have not been examined in respect of:

the entire international application,

claims Nos. 13,14  
because:  
 the said international application, or the said claims Nos. relate to the following subject matter which does not require an international preliminary examination (specify):  
 the description, claims or drawings (*indicate particular elements below*) or said claims Nos. 13,14 are so unclear that no meaningful opinion could be formed (specify):  
**see separate sheet**  
 the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed.  
 no international search report has been established for the said claims Nos.

2. A meaningful international preliminary examination cannot be carried out due to the failure of the nucleotide and/or amino acid sequence listing to comply with the standard provided for in Annex C of the Administrative Instructions:

the written form has not been furnished or does not comply with the Standard.  
 the computer readable form has not been furnished or does not comply with the Standard.

**IV. Lack of unity of invention**

1. In response to the invitation to restrict or pay additional fees, the applicant has:

restricted the claims.  
 paid additional fees.  
 paid additional fees under protest.  
 neither restricted nor paid additional fees.

2.  This Authority found that the requirement of unity of invention is not complied with and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees.

3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is

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complied with.

not complied with for the following reasons:

4. Consequently, the following parts of the international application were the subject of international preliminary examination in establishing this report:

all parts.

the parts relating to claims Nos. .

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Yes: Claims	4,5,9,10,15,16,19,20,23
	No: Claims	1-3,6-8,11,12,17,18,21,22,24
Inventive step (IS)	Yes: Claims	4,5,9,10,15,16,23
	No: Claims	1-3,6-8,11,12,17,18-22,24
Industrial applicability (IA)	Yes: Claims	1-24
	No: Claims	

2. Citations and explanations

**see separate sheet**

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET**

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**Re Item III**

**Non-establishment of opinion with regard to novelty, inventive step and industrial applicability**

Claims 13 and 14 are not clear (Art.6 PCT), because it cannot be understood what features distinguish "basic metric values" and "basic encoding parameters" from 'normal' metric values and encoding parameters.

**Re Item IV**

**Lack of unity of invention**

Although the applicants have not been invited to restrict the claims or to pay additional fees, the application lacks unity in the sense of Rule 13 PCT.

The independent claims can be summarised as follows:

- Claims 1, 5 and 18 define the use or the generation of metric values based on metric functions and respective encoding parameters for selecting encoding parameters in order to achieve a desired quantity of encoded video data.
- Claim 19 specifies the selection from two different quantisers the encoded data being closest to a target, whereby the two different quantisation levels are somehow estimated.

The common concept of merely selecting a certain configuration of a quantiser in order to achieve a target encoded data rate is known from D1 and, consequently, this common concept cannot be considered to be novel or inventive.

**Re Item V**

**Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

**V.1 Reference is made to the following documents:**

D1: LEE J-W ET AL: 'TARGET BIT MATCHING FOR MPEG-2 VIDEO RATE CONTROL', PROCEEDINGS OF IEEE TENCON'98, IEEE REGION 10 INTERNATIONAL CONFERENCE ON GLOBAL CONNECTIVITY IN ENERGY, COMPUTER, COMMUNICATION AND CONTROL, NEW DELHI, INDIA, DEC. 17 - 19, 1998, IEEE REGION 10 ANNUAL CONFERENCE, NEW YORK, NY: IEEE, US, vol. 1 OF 2, 17 December 1998, pages 66-69,

XP000878387, ISBN: 0-7803-4887-7

D2: EP-A-0 912 062 (MATSUSHITA ELECTRIC IND CO LTD), 28 April 1999  
D3: EP-A-0 582 819 (SONY CORP), 16 February 1994

The document D3 was not cited in the international search report and has been introduced by the examiner in accordance with Art.33(6) PCT.

**V.2 Regarding claims 1, 6, 17-18, 21-22 and 24: (novelty, Art.33(2) PCT)**

D1 (sections 2-3) discloses an enhanced MPEG-2 TM5 algorithm for a video compression system which performs bit rate control to allow for the transfer of encoded video data via a bandwidth limited channel. Target numbers of bits (T) for the various MPEG picture types are calculated (equations (2)-(4)) taking into account global complexity measures (X). 'T' forms an equivalent to the "desired quantity of encoded video data".

A spatial activity measure (so-called 'scaling factor') of each macroblock ( $y_i$ ) and a related average for the whole frame ( $y_{avg}$ ) is calculated. An initial quantisation ("encoding") parameter ( $Q_{init}$ ) is determined based on a wanted number of coding bits per macroblock ( $B_{avg}$ ).  $B_{avg}$  which is directly related to the target bit rate of the frame (T, eq.17) is determined for a reference macroblock which matches with the calculated average scaling factor ( $y_{avg}$ ). All these dependencies lead to a bit rate control parameter (C) (eq.18) which is determined per frame.

The bit rate control parameter C is considered to form an equivalent to the claimed "metric value". Equations 13 and 18 form a "predetermined relationship" between C and T (via the dependency between  $B_{avg}$  and  $y_{avg}$ ) which is used to determine the required quantisation for macroblock having a different scaling factor than the one of the reference macroblock.

D1 (section 3.3) also describes how a "second" quantisation parameter ( $Q_i$ ) is derived from a reference ("first") quantisation parameter ( $Q_{ref}$ ) taking in to account the quantities of encoded data using the reference quantisation parameter and the relationship (eq.13).

**V.3 Regarding claims 2-3:**

**(novelty, Art.33(2) PCT)**

The calculation of errors between actually achieved and estimated bit rates on block level ( $BIT_{estimated}$ ,  $BIT_{actual}$ ) and sums of all previous macroblock having the same coding type (being an equivalent for a frame in intra-mode) are also known from D1 (section 3.3). Equation 21 is understood as a macroblock-wise

"adjustment" of equation 13.

**V.4 Regarding claims 7-8 and 11-12:** (novelty, Art. 33(2) PCT)

In section 3.2 of D1 it is proposed to use a metric function which is based on the AC coefficients of a macroblock weighted by the DC coefficient (eq.14). Equation 14 also shows that the summation is performed blockwise before the total sum per macroblock is calculated.

**V.5 Regarding claims 19-20:** (inventive step, Art.33(3) PCT)

D2 (paragraphs [0130]-[0149]) describes an imaging encoder (fig.19) using two parallel quantisers applying a minimum and a maximum quantisation table to the transformed image data. The quantiser which provides a best match to a given target image size is then selected. An optimisation of the standard quantisation tables (figs. 20-21) based on the output data amount of the two quantisers is also explained.

D2 only considers the data amount generated after quantisation.

The problem to be solved by the present invention may be regarded as how to implement the concept disclosed in D2 in case the transform coding is to be followed by additional variable length (entropy) coding. There appear to be only two solutions. Either the entropy coding is to be taken into account or not.

D3 which discloses an encoder concept with parallel adjustable quantisers whereby the generated data amount after variable length coding gives a clear hint that such coding can be taken into account. In order not to give up the advantageous parallel processing known from D2 the skilled person would implement an additional variable length coder known from D3 in each of the coding branches of D2 in order to solve the problem posed.

**V.6** The claimed invention is considered industrially applicable in the field of video coding in accordance with Art.33(4) PCT.